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EXAMINER

NGUYEN, TAM M

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 08/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/998,077

Applicant(s)

KIM ET AL.

Examiner

Tam M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Objections

Claim 19 is objected to because of the following informalities: The word "t-putylbenzene" in line 8 of claim 19 is misspelled. The word should be recited as --t-butylbenzene--. Appropriate correction is required.

Claim 8 is objected to because the following informalities: The expressions "the liquid mixture" and "the liquid mixture" in lines 2 and 4, respectively, is inconsistent. The examiner suggests that the expressions "the liquid mixture" should be changed to --the feedstock--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 5, 8, 15 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "the liquid mixture" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim 8 recites the limitation "the gaseous mixture" in line 8. There is insufficient antecedent basis for this limitation in the claim.

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Claim 15 recites the limitation "the liquid mixture" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim 18 recites the limitation "the olefin in the gaseous mixture" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (JP-61050929) in view of Kaminsky et al. (6,124,517).

Yamamoto discloses a process for removing acetylene compounds (including phenylacetylene) from a mixture of styrene (aromatic monomer) by contacting the mixture with an adsorbent comprising zero-valent copper and/or silver (metallic metal) that is supported by a carrier. No acetylene compounds are detected in the in the styrene product. (See claim 1 and example 5)

Regarding claims 1, 3, 6, 11, 13, 16, 19 and 20, Yamamoto does not specifically disclose that the adsorbent has a high surface area. However, Kaminsky discloses a high surface area adsorbent having BET in a range of from about 10 to about 2000 square meters per gram (see col. 8, lines 28-42). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Yamamoto by using a high surface area as taught by Kaminsky because such surface area is effective to adsorb acetylene compounds from a hydrocarbon mixture.

Regarding claims 1, 11 and 19, Yamamoto does not specifically disclose that the styrene mixture comprises more than about 100 ppm of phenylacetylene. However, Yamamoto discloses that acetylene compounds can be eliminated even when their concentration is in the range of 10^{-4} to 10 wt. % (10 ppm – 100,000 ppm). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Yamamoto by utilizing a styrene mixture comprising more than about 100 ppm of

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phenylacetylene as claimed because one of skill in the art would use a mixture which comprises any acetylene compound in the amount of from 10 to 100000 ppm including the claimed amount.

Regarding claims 1, 11 and 19, Yamamoto does not disclose that the support is dispersed at least one metallic metal. However, Kaminsky discloses a method of making an adsorbent by dispersing metal on the support (see Kaminsky col. 7, lines 62-67). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Yamamoto by dispersing metals on support as taught by Kaminsky because Yamamoto discloses that no specific limitation is imposed on the method for preparing the adsorbent (see Yamamoto lines 3-4 of page 6).

Regarding claims 1, 11 and 19, Yamamoto does not disclose the regeneration step of the adsorbent. However, Kaminsky discloses a regeneration step of adsorbent by using hydrogen gas (see Kaminsky col. 12, lines 26-30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Yamamoto by regenerating the adsorbent as taught by Kaminsky because the adsorbent of Yamamoto is chemically and physically similar to the Kaminsky adsorbent, so it would be expected that hydrogen would be an effective component to remove acetylene compounds from the adsorbent of Yamamoto.

Regarding claims 2, 11, 12 and 19, the aromatic monomer is styrene. (See example 5 of Yamamoto)

Regarding claim 3, 11 and 19, the support is alumina. (See the last two lines of page 5, the next to the last line of page 7)

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Regarding claims 4, 7, 9, 14, 17 and 20, Yamamoto does not specifically disclose that the adsorbent comprises 0.01 to about 10 wt. % of metal. However, Yamamoto discloses that the adsorbent contains about 1 to 48 wt. % of metal. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Yamamoto by employing the claimed amount of metal because one of skill in the art would use any amount of metal from 1-48 wt. % including the claimed amount. (See lines 2-3 of page 6)

Regarding claim 5 and 15, the liquid mixture is contacted with the adsorbent at liquid hourly space velocities of from 0.1 to 80 hr⁻¹. (See page 7, lines 3-5)

Regarding claims 6, 9 and 16, when one of skill selects that the adsorbent comprises about 9 wt. % of metal, the adsorbent would comprise about 91 wt. % of γ -alumina (see Yamamoto; the last line of page 5, line 2 of page 6, and the next to the last line of page 7)

Regarding claim 7, 14, 17 and 20, Yamamoto does not disclose that the metal dispersed on the support material is palladium. However, Kaminsky discloses that the metal dispersed on the support is selected from copper, silver, and palladium (see Kaminsky; col. 7, lines 62-67). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Yamamoto by using palladium instead of copper or silver because palladium has an equivalent function as copper or silver in the adsorbent.

Regarding claims 8 and 20, the liquid mixture does not contain hydrogen, mercury, arsenic, and sulfur components. The adsorption step is operated at a temperature of from 0 to 100° C (see page 6, lines 19-20; example 5)

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Regarding claim 10, Yamamoto does not disclose that metal dispersion is measured by carbon monoxide chemisorption method. However, Kaminsky disclose that the dispersion is measured by carbon monoxide technique (see col. 9, lines 7-17). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Yamamoto by measuring the metal dispersion value by the method as taught by Kaminsky because such method is a effective to analyze how much metal in the adsorbent. Since the Yamamoto adsorbent contains about 1 to 48 wt. % of metal (see lines 2-3 of page 6), it would be expected that the modified Yamamoto adsorbent would have a metal dispersion value of at least 10 percent as claimed.

Regarding claims 11 and 19, the acetylene compound is phenylacetylene. (See sample 5)


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (703) 305-7715.

The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Tam M. Nguyen
Examiner
Art Unit 1764

TN
July 28, 2003